

**CORONARY  
ARTERY  
BYPASS  
SURGERY**

**in  
New York State**

***1994-1996***

**New York State Department of Health  
October 1998**



# New York State Department of Health

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## INTRODUCTION

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The information contained in this booklet is intended for health care providers, patients and families of patients who are considering coronary artery bypass surgery. It provides data on risk factors associated with bypass surgery mortality and lists hospital and physician-specific mortality rates which have been risk-adjusted to account for differences in patient severity of illness.

New York State has taken a leadership role in setting standards for cardiac services, monitoring outcomes and sharing performance data with patients, hospitals and physicians. Hospitals and doctors involved in cardiac care have worked in cooperation with the Department of Health and the Cardiac Advisory Committee to compile accurate and meaningful data which can and has been used to enhance quality of care. We believe that this process has been instrumental in achieving the excellent outcomes that are evidenced in this report for centers across New York State.

We encourage doctors to discuss this information with their patients and colleagues as they develop treatment plans. While these statistics are an important tool in making informed health care choices, individual treatment plans must be made by doctors and patients together after careful consideration of all pertinent factors. It is important to recognize that many factors can influence the outcome of coronary artery bypass surgery. These include the patient's health before the procedure, the skill of the operating team and general after care. In addition, keep in mind that the information in this booklet does not include data from 1997 or 1998. Important changes may have taken place in some hospitals during that time period.

In developing treatment plans, it is important that patients and physicians alike give careful consideration to the importance of healthy lifestyles for all those affected by heart disease. While some risk factors, such as heredity, gender and age cannot be controlled, others certainly can. Controllable risk factors that contribute to a higher likelihood of developing coronary artery disease are high cholesterol levels, cigarette smoking, high blood pressure, obesity and a lack of exercise. Limiting these risk factors after bypass surgery will continue to be important in minimizing the occurrence of new blockages.

Providers of this state and the Cardiac Advisory Committee are to be commended for the excellent results that have been achieved through this cooperative quality improvement system. The Department of Health will continue to work in partnership with hospitals and physicians to ensure the continued high quality of cardiac surgery available to New York residents.



## CORONARY ARTERY BYPASS GRAFT SURGERY (CABG)

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Heart disease is, by far, the leading cause of death in New York State, and the most common form of heart disease is atherosclerotic coronary artery disease. Different treatments are recommended for patients with coronary artery disease. For some people, changes in lifestyle, such as dietary changes, not smoking and regular exercise, can result in great improvements in health. In other cases, medication prescribed for high blood pressure or other conditions can make a significant difference.

Sometimes, however, an interventional procedure is recommended. The two common procedures performed on patients with coronary artery disease are coronary artery bypass graft (CABG) surgery and percutaneous transluminal coronary angioplasty (PTCA).

Coronary artery bypass graft surgery is a procedure in which a vein or artery from another part of the body is used to create an alternate path for blood to flow to the heart, bypassing the arterial blockage. Typically, a section of one of the large (saphenous) veins in the leg, the radial artery in the arm or the mammary artery in the

chest is used to construct the bypass. One or more bypasses may be performed during a single operation, since providing several routes for the blood supply to travel is believed to improve long-term success for the procedure. Triple and quadruple bypasses are often done for this reason, not necessarily because the patient's condition is more severe. CABG surgery is one of the most common, successful major operations currently performed in the United States.

As is true of all major surgery, risks must be considered. The patient is totally anesthetized, and there is generally a substantial recovery period in the hospital followed by several weeks recuperation at home. Even in successful cases, there is a risk of relapse causing the need for another operation.

Those who have CABG surgery are not cured of coronary artery disease; the disease can still occur in the grafted blood vessels or other coronary arteries. In order to minimize new blockage, patients should continue to reduce their risk factors for heart disease.

## THE HEALTH DEPARTMENT PROGRAM

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The New York State Department of Health has been studying the effects of patient and treatment characteristics (called risk factors) on outcomes for patients with heart disease. Detailed statistical analyses of the information received from the study have been conducted under the guidance of the New York State Cardiac Advisory Committee, a group of independent practicing cardiac surgeons, cardiologists and other professionals in related fields.

The results have been used to create a cardiac profile system which assesses the performance of hospitals and surgeons over time, independent of the severity of individual patients' pre-operative conditions.

Designed to improve health in people with heart disease, this program is aimed at:

- understanding the health risks of patients which adversely affect how they will fare in coronary artery bypass surgery;
- improving the results of different treatments of heart disease;
- improving cardiac care;
- providing information to help patients make better decisions about their own care.

## PATIENT POPULATION

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All patients undergoing isolated coronary artery bypass graft surgery (CABG surgery with no other major heart surgery during the same admission) in New York State hospitals who were discharged in 1996 are included in the one-year results for coronary artery bypass surgery. Similarly, all patients undergoing isolated CABG surgery who were discharged between January 1, 1994, and

December 31, 1996, are included in the three-year results.

Isolated CABG surgery represented 73.92 percent of all adult cardiac surgery for the three-year period covered by this report. Total cardiac surgery volume and isolated CABG volume are tabulated in Table 5 by hospital and surgeon for the period 1994 through 1996.

## RISK ADJUSTMENT FOR ASSESSING PROVIDER PERFORMANCE

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Provider performance is directly related to patient outcomes. Whether patients recover quickly, experience complications or die following a procedure is in part a result of the kind of medical care they receive. It is difficult, however, to compare outcomes across hospitals when assessing provider performance, because different hospitals treat different types of patients. Hospitals with sicker patients may have higher rates of complications and death than other hospitals in the state. The following describes how the New York State Department of Health adjusts for patient risk in assessing provider outcomes.

### **Data Collection, Data Validation and Identifying In-Hospital Deaths**

As part of the risk-adjustment process, New York State hospitals where CABG surgery is performed provide information to the Department of Health for each patient undergoing that procedure. Cardiac surgery departments collect data concerning patients' demographic and clinical characteristics. Approximately 40 of these

characteristics (called risk factors) are collected for each patient. Along with information about the procedure, physician and the patient's status at discharge, these data are entered into a computer, and sent to the Department of Health for analysis.

Data are verified through review of unusual reporting frequencies, cross-matching of cardiac surgery data with other Department of Health databases and a review of medical records for a selected sample of cases. These activities are extremely helpful in ensuring consistent interpretation of data elements across hospitals.

The analysis bases mortality on deaths occurring during the same hospital stay in which a patient underwent cardiac surgery. In the past, the data validation activities have focused on the acute care stay at the surgery center. However, changes in the health care system have resulted in an increasing number of administrative discharges within the hospital. For example, a patient may be discharged from an acute care bed to a hospice or rehabilitation bed within the same hospital stay in order to differentiate

reimbursement for differing levels of care. Data validation activities for 1996 identified one facility where such administrative discharges lead to a substantial misrepresentation of cardiac surgery mortalities for that program. In order to assure consistency across all programs, a review of statewide discharge patterns was instituted to confirm all deaths occurring within the premises of the cardiac surgery center. It should be noted that the bulk of the additional deaths identified were at one facility and that reporting practices at that facility have been scrutinized by the Department of Health and the Cardiac Advisory Committee. The program will be carefully monitored in the future.

In this report, an in-hospital death is defined as a patient who died subsequent to CABG surgery during the same acute care admission; was discharged to another unit of the same hospital (e.g., hospice care, rehabilitation) and died; or was transferred to a formally affiliated cardiac surgery program and died.

### **Assessing Patient Risk**

Each person who develops coronary artery disease has a unique health history. A cardiac profile system has been developed to evaluate the risk of treatment for each individual patient based on his or her history, weighing the important health facts for that person based on the experiences of thousands of patients who have undergone the same procedures in recent years. All important risk factors for each patient are combined to create a risk profile.

An 80-year-old patient with a history of two heart attacks, for example, has a very different risk profile than a 40-year-old with no previous heart problems.

The statistical analyses conducted by the Department of Health consist of determining which of the risk factors collected are significantly related to in-hospital death for CABG surgery, and determining how to weight the significant risk factors to predict the chance each patient will have of dying in the hospital, given his or her specific characteristics.

Doctors and patients should review individual risk profiles together. Treatment must be made by doctors and patients together after consideration of all the information.

### **Predicting Patient Mortality Rates for Providers**

The statistical methods used to predict mortality on the basis of the significant risk factors are

tested to determine if they are sufficiently accurate in predicting mortality for patients who are extremely ill prior to undergoing the procedure as well as for patients who are relatively healthy. These tests have confirmed that the models are reasonably accurate in predicting how patients of all different risk levels will fare when undergoing coronary bypass surgery.

The mortality rate for each hospital and surgeon is also predicted using the statistical model. This is accomplished by summing the predicted probabilities of death for each of the provider's patients and dividing by the number of patients. The resulting rate is an estimate of what the provider's mortality rate would have been if the provider's performance were identical to the state performance. The percentage is called the **predicted or expected mortality rate**.

### **Computing the Risk-Adjusted Rate**

The risk-adjusted mortality rate represents the best estimate, based on the associated statistical model, of what the provider's mortality rate would have been if the provider had a mix of patients identical to the statewide mix. Thus, the risk-adjusted mortality rate has, to the extent possible, ironed out differences among providers in patient severity of illness, since it arrives at a mortality rate for each provider for an identical group of patients.

To get the risk-adjusted mortality rate, the observed mortality rate is first divided by the provider's expected mortality rate. If the resulting ratio is larger than one, the provider has a higher mortality rate than expected on the basis of its patient mix; if it is smaller than one, the provider has a lower mortality rate than expected from its patient mix. The ratio is then multiplied by the overall statewide mortality rate (2.44% in 1996) to obtain the provider's risk-adjusted rate.

### **Interpreting the Risk-Adjusted Mortality Rate**

If the risk-adjusted mortality rate is lower than the statewide mortality rate, the provider has a better performance than the state as a whole; if the risk-adjusted mortality rate is higher than the statewide mortality rate, the provider has a worse performance than the state as a whole.

The risk-adjusted mortality rate is used in this report as a measure of quality of care provided by hospitals and surgeons. However, there are reasons that a provider's risk-adjusted mortality rate may not be indicative of its true quality.

For example, extreme outcome rates may occur due to chance alone. This is particularly true for low-volume providers, for whom very high or very low mortality rates are more likely to occur than for high-volume providers. To prevent misinterpretation of differences caused by chance variation, confidence intervals are reported in the results. The interpretations of those terms are provided later when the data are presented.

Differences in hospital coding of risk factors could be an additional reason that a provider's risk-adjusted rate may not be reflective of quality of care. The Department of Health monitors the quality of coded data by reviewing patients' medical records to ascertain the presence of key risk factors. When significant coding problems have been discovered, hospitals have been required to recode these data and have been subjected to subsequent monitoring.

A final reason that risk-adjusted rates may be misleading is that overall preprocedural severity of illness may not be accurately estimated because important risk factors are missing. This is not considered to be an important factor, however, because the New York State data system contains virtually every risk factor that has ever been demonstrated to be related to patient mortality in national and international studies.

Although there are reasons that risk-adjusted mortality rates presented here may not be a perfect reflection of quality of care, the Department of Health feels that this information is a valuable aid in choosing providers for CABG surgery.

### **How This Contributes to Quality Improvement**

The goal of the Department of Health and the Cardiac Advisory Committee is to improve the quality of care in relation to coronary artery bypass graft surgery in New York State. Providing the hospitals and cardiac surgeons in New York State with data about their own outcomes for these procedures allows them to examine the quality of their own care, and to identify areas that need improvement.

The data collected and analyzed in this program are given to the Cardiac Advisory Committee. Committee members assist with interpretation and advise the Department of Health regarding which hospitals and surgeons may need special attention. Committee members have also conducted site visits to particular hospitals, and have recommended that some hospitals obtain the expertise of outside consultants to design improvements for their programs.

The overall results of this program of ongoing review in CABG surgery show that significant progress is being made. In response to the program's results for CABG surgery, facilities have refined patient criteria, evaluated patients more closely for preoperative risks and directed them to the appropriate surgeon. More importantly, many hospitals have identified medical care process problems that have led to less than optimal outcomes, and have altered those processes to achieve improved results.

## **RESULTS**

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### **1996 Risk Factors for CABG Surgery**

The significant preoperative risk factors for coronary artery bypass surgery in 1996 are presented in Table 1.

Roughly speaking, the odds ratio for a risk factor represents the number of times more likely a patient with that risk factor is of dying in the hospital during or after CABG surgery than a patient without the risk factor, all other risk factors being the same. For example, the odds ratio for the risk factor "diabetes" is 1.688. This means that a patient who has diabetes is approximately 1.688 times as likely to die in the hospital as a patient who does not have diabetes but who has the same other significant risk factors.

For most of the risk factors in the table, there are only two possibilities: having the risk factor or not having it (for example, a patient either has diabetes or does not have it). Exceptions are age, body surface area (which is calculated using the patient's height and weight), ejection fraction (which is a measure of the heart's ability to pump blood), and previous myocardial infarction (MI, or heart attack).

For body surface area, the odds ratio roughly represents the number of times more likely a patient is to die in the hospital than a patient with a body surface area that is one unit smaller.

For age and age<sup>2</sup>, the relationship is more complicated because there is a quadratic

(squared) term in addition to a linear term. No odds ratios are given for these two terms because they should be considered in conjunction with one another.

The odds ratios for the categories for ejection fraction are relative to the omitted range (40% and higher). Thus, patients with ejection fractions

of less than 20% have odds of dying in the hospital that are 3.604 times the odds of a person with an ejection fraction of 40% or higher, all other risk factors being the same. Similarly, the odds ratios for the categories of previous MI are relative to the omitted categories, which are “no MI or an MI more than seven days prior to surgery.”

**Table 1:** Multivariable risk factor equation for CABG hospital deaths in New York State in 1996.

Patient Risk Factor	Logistic Regression		Odds Ratio
	Coefficient	P-Value	
<b>Demographic</b>			
Age	-0.1327	0.0040	....
(Age) <sup>2</sup> /100	0.1345	<.0001	....
Female Gender	0.5448	<.0001	1.724
Body Surface Area	-0.8177	0.0011	0.441
<b>Hemodynamic State</b>			
Unstable	0.8470	<0.0001	2.333
Shock	2.6546	<0.0001	14.219
<b>Comorbidities</b>			
Chronic Obstructive Pulmonary Disease	0.3927	0.0010	1.481
Diabetes	0.5237	<0.0001	1.688
Renal Failure with Dialysis	1.8253	<0.0001	6.205
Renal Failure, Creatinine > 2.5	0.9783	<0.0001	2.660
Hepatic Failure	2.1878	<0.0001	8.916
<b>Severity of Atherosclerotic Process</b>			
Aortoiliac Disease	0.9201	<0.0001	2.509
Stroke	0.6247	<0.0001	1.868
<b>Ventricular Function</b>			
Prev. MI < 24 Hrs.	0.9226	<0.0001	2.516
Previous MI, 1-7 days	0.4184	0.0014	1.520
Ejection Fraction Less Than 20%	1.2821	<0.0001	3.604
Ejection Fraction 20%-29%	0.6505	<0.0001	1.916
Ejection Fraction 30%-39%	0.4806	<0.0001	1.617
Previous Open Heart Operations	1.2858	<0.0001	3.617
Intercept = -0.7081			
C Statistic = .813			

## 1996 HOSPITAL OUTCOMES FOR CABG SURGERY

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Table 2 and Figure 1 present the 1996 CABG surgery results for the 32 hospitals performing this operation in New York. The table contains, for each hospital, the number of isolated CABG operations (CABG operations with no other major heart surgery) resulting in 1996 discharges, the number of in-hospital deaths, the observed mortality rate, the expected mortality rate based on the statistical model presented in Table 1, the risk-adjusted mortality rate and a 95% confidence interval for the risk-adjusted rate.

Definitions of key terms follow:

The **observed mortality rate (OMR)** is the number of observed deaths divided by the total number of patients who underwent isolated CABG surgery.

The **expected mortality rate (EMR)** is the sum of the predicted probabilities of death for all patients divided by the total number of patients.

The **risk-adjusted mortality rate (RAMR)** is the best estimate, based on the statistical model, of what the provider's mortality rate would have been if the provider had a mix of patients identical to the statewide mix.

**Confidence intervals** for the risk-adjusted mortality rate indicate which hospitals had significantly more or fewer deaths than expected given the risk factors of their patients. Hospitals with significantly higher rates than expected after adjusting for risk are those with confidence intervals entirely above the statewide rate. Hospitals with significantly lower rates than expected given the severity of illness of their patients before surgery have confidence intervals entirely below the statewide rate.

As indicated in Table 2, the overall mortality rate for the 20,078 CABG operations performed at the 32 hospitals was 2.44%. Observed mortality rates ranged from 0.86% to 6.38%. The range in expected mortality rates, which measure patient severity of illness, was from 1.38% to 3.45%.

The risk-adjusted mortality rates, which are used to measure performance, ranged from 1.10% to 5.93%. One hospital, St. Joseph's, had a risk-adjusted mortality rate that was significantly lower than the statewide rate. Three hospitals, St. Vincent's, St. Luke's-Roosevelt and Lenox Hill, had significantly higher risk-adjusted rates than the statewide average.

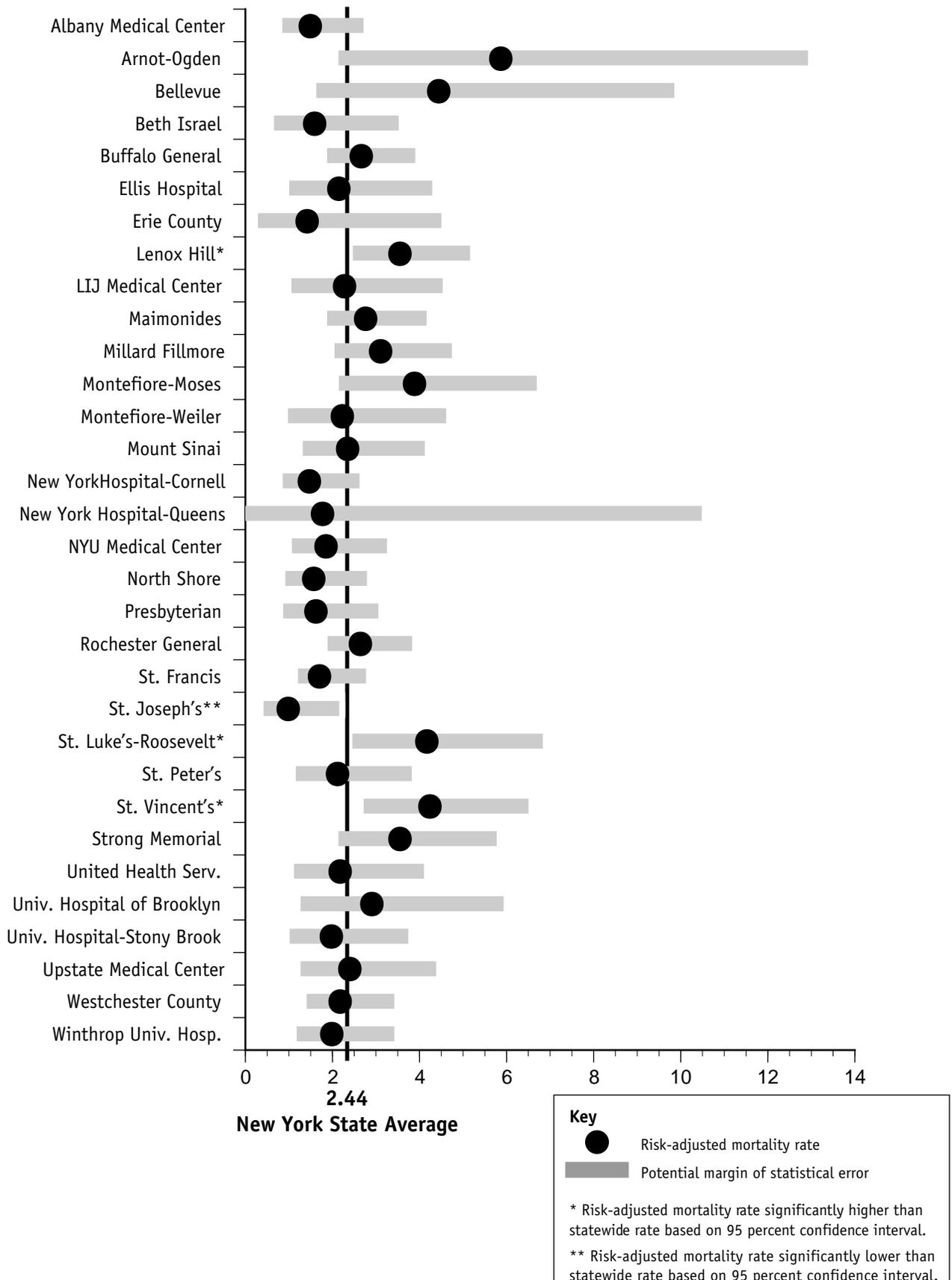
**Table 2:** Hospital Observed, Expected and Risk-Adjusted Mortality Rates (RAMR) for CABG Surgery in New York State, 1996 Discharges (Listed Alphabetically by Hospital)

Hospital	Cases	Deaths	OMR	EMR	RAMR	95% CI for RAMR
Albany Medical Center	1136	14	1.23	1.88	1.60	(0.87, 2.69)
Arnot-Ogden	135	6	4.44	1.83	5.93	(2.16, 12.90)
Bellevue	94	6	6.38	3.45	4.52	(1.65, 9.83)
Beth Israel	428	7	1.64	2.35	1.70	(0.68, 3.50)
Buffalo General	1227	33	2.69	2.38	2.76	(1.90, 3.88)
Ellis Hospital	548	9	1.64	1.78	2.25	(1.03, 4.27)
Erie County	259	3	1.16	1.84	1.53	(0.31, 4.48)
Lenox Hill	860	32	3.72	2.49	3.64*	(2.49, 5.14)
LIJ Medical Center	407	9	2.21	2.27	2.38	(1.08, 4.51)
Maimonides	821	28	3.41	2.91	2.86	(1.90, 4.14)
Millard Fillmore	873	25	2.86	2.19	3.20	(2.07, 4.72)
Montefiore-Moses	378	14	3.70	2.27	3.97	(2.17, 6.67)
Montefiore-Weiler	321	8	2.49	2.61	2.33	(1.00, 4.59)
Mount Sinai	494	14	2.83	2.83	2.45	(1.34, 4.10)
New York Hospital-Cornell	798	15	1.88	2.91	1.58	(0.88, 2.60)
New York Hospital-Queens	94	1	1.06	1.38	1.88	(0.02, 10.46)
NYU Hospitals Center	585	15	2.56	3.20	1.96	(1.09, 3.23)
North Shore	831	15	1.81	2.62	1.68	(0.94, 2.77)
Presbyterian	689	12	1.74	2.45	1.73	(0.89, 3.03)
Rochester General	1007	35	3.48	3.10	2.74	(1.91, 3.81)
St. Francis	1814	31	1.71	2.30	1.81	(1.23, 2.57)
St. Joseph's	812	7	0.86	1.91	1.10**	(0.44, 2.27)
St. Luke's-Roosevelt	430	17	3.95	2.27	4.25*	(2.48, 6.81)
St. Peter's	741	13	1.75	1.93	2.22	(1.18, 3.80)
St. Vincent's	522	23	4.41	2.49	4.32*	(2.74, 6.48)
Strong Memorial	448	18	4.02	2.69	3.64	(2.16, 5.75)
United Health Serv.	409	11	2.69	2.88	2.28	(1.14, 4.08)
Univ.Hosp. of Brooklyn	217	8	3.69	3.00	3.00	(1.29, 5.91)
Univ.Hosp.-Stony Brook	498	11	2.21	2.59	2.08	(1.04, 3.72)
Univ.Hosp.-Upstate	494	12	2.43	2.38	2.50	(1.29, 4.36)
Westchester County	924	22	2.38	2.55	2.28	(1.43, 3.44)
Winthrop Univ. Hosp.	784	16	2.04	2.38	2.09	(1.20, 3.40)
<b>Total</b>	<b>20078</b>	<b>490</b>	<b>2.44</b>			

\* Risk-adjusted mortality rate significantly higher than statewide rate based on 95 percent confidence interval.

\*\* Risk-adjusted mortality rate significantly lower than statewide rate based on 95 percent confidence interval.

**Figure 1: Risk-Adjusted Mortality Rates for CABG in New York State, 1996 Discharges (Listed Alphabetically by Hospital)**



## 1994-1996 HOSPITAL AND SURGEON DATA FOR CABG SURGERY

Table 3 provides the number of isolated CABG operations, number of CABG patients who died in the hospital, observed mortality rate, expected mortality rate, risk-adjusted mortality rate and the 95% confidence interval for the risk-adjusted mortality rate for 1994-96 for each of the 32 hospitals performing CABG surgery during the time period.

This hospital information is presented for each surgeon (a) who performed 200 or more isolated CABG operations during 1994-1996, and/or (b) who performed at least one isolated CABG operation in each of the years 1994-1996. Please note that in previous years information was not supplied for the second group. The Cardiac Advisory Committee has recommended that this group be included in this year's report in order to provide more complete information to hospitals, surgeons and the public.

The results for surgeons not meeting the above criteria are grouped together and reported as "other cases" in the hospital in which the

operations were performed. Surgeons who performed operations in more than one hospital are noted in the table and are listed in all hospitals in which they performed 200 or more operations and/or performed at least one operation in each of the years 1994-1996.

Also, surgeons who met criterion (a) and/or criterion (b) above and have performed CABG surgery in two or more New York State hospitals are listed separately in Table 4. For these surgeons, the table presents the number of isolated CABG operations, the number of deaths, observed mortality rate, expected mortality rate and risk-adjusted mortality rate with its 95 percent confidence interval for each hospital in which the surgeon performed surgery, as well as the aggregate numbers (across all hospitals in which the surgeon performed operations). In addition, surgeons and hospitals with risk-adjusted mortality rates that are significantly lower or higher than the statewide mortality rate (as judged by a 95% confidence interval) are noted in Tables 3 and 4.

**Table 3:** Observed, Expected and Risk-Adjusted Hospital and Surgeon In-Hospital Mortality Rates for CABG Surgery, 1994-1996

	Cases	No. of Deaths	OMR	EMR	RAMR	95% CI for RAMR
<b>Albany Medical Center Hospital</b>						
##Banker M	232	5	2.16	1.44	3.70	(1.19, 8.64)
#Bennett E	56	0	0.00	2.71	0.00	(0.00, 5.99)
#Britton L	473	5	1.06	1.70	1.54	(0.50, 3.60)
#Canavan T	600	5	0.83	1.75	1.18	(0.38, 2.76)
##Dal Col R	3	0	0.00	0.84	0.00	(0.00,100.0)
Ferraris V	229	9	3.93	2.76	3.54	(1.61, 6.72)
Foster E	276	4	1.45	2.37	1.51	(0.41, 3.88)
Kelley J	438	7	1.60	2.04	1.95	(0.78, 4.01)
Luber J	528	14	2.65	2.42	2.71	(1.48, 4.55)
##Miller S	458	3	0.66	2.25	0.72**	(0.15, 2.11)
##Saifi J	2	0	0.00	3.24	0.00	(0.00,100.0)
All Others	171	1	0.58	1.30	1.12	(0.01, 6.22)
TOTAL	3466	53	1.53	2.04	1.86 **	(1.40, 2.44)
<b>Arnot-Ogden Medical Center</b>						
Borja A	157	3	1.91	2.55	1.86	(0.37, 5.43)
Quintos E	260	8	3.08	2.36	3.23	(1.39, 6.37)
Vaughan J	153	2	1.31	2.65	1.22	(0.14, 4.41)
TOTAL	570	13	2.28	2.49	2.27	(1.21, 3.88)

**Table 3 continued**

	Cases	No. of Deaths	OMR	EMR	RAMR	95% CI for RAMR
<b>Bellevue Hospital Center</b>						
#Colvin S	46	8	17.39	2.86	15.08 *	(6.50, 29.72)
#Crawford B	1	0	0.00	5.21	0.00	(0.00, 100.0)
#Galloway A	48	2	4.17	2.54	4.07	(0.46, 14.70)
#Glassman L	114	4	3.51	2.04	4.27	(1.15, 10.93)
#Grossi E	3	1	33.33	5.11	16.17	(0.21, 89.95)
#Ribakove G	78	2	2.56	2.24	2.84	(0.32, 10.26)
TOTAL	290	17	5.86	2.35	6.19 *	(3.61, 9.92)
<b>Beth Israel Medical Center</b>						
Hoffman D	147	1	0.68	1.72	0.98	(0.01, 5.45)
#Stelzer P	101	1	0.99	2.80	0.88	(0.01, 4.87)
Tranbaugh R	772	17	2.20	2.66	2.05	(1.20, 3.29)
All Others	33	0	0.00	2.00	0.00	(0.00, 13.78)
TOTAL	1053	19	1.80	2.52	1.78	(1.07, 2.77)
<b>Buffalo General Hospital</b>						
Bergsland J	498	13	2.61	2.71	2.39	(1.27, 4.09)
Bhayana J	318	7	2.20	2.38	2.29	(0.92, 4.73)
Grosner G	723	10	1.38	2.31	1.49	(0.71, 2.73)
Lajos T	494	19	3.85	2.22	4.29 *	(2.58, 6.71)
Levinsky L	247	0	0.00	2.19	0.00 **	(0.00, 1.68)
Lewin A	643	14	2.18	1.94	2.79	(1.52, 4.68)
Raza S	493	21	4.26	2.27	4.66 *	(2.88, 7.12)
Salerno T	214	9	4.21	2.94	3.54	(1.62, 6.73)
All Others	1	0	0.00	3.30	0.00	(0.00, 100.0)
TOTAL	3631	93	2.56	2.32	2.74	(2.21, 3.36)
<b>Ellis Hospital</b>						
##Banker M	1	0	0.00	0.92	0.00	(0.00, 100.0)
#Britton L	2	0	0.00	0.95	0.00	(0.00, 100.0)
#Canavan T	2	0	0.00	1.36	0.00	(0.00, 100.0)
##Dal Col R	3	0	0.00	1.66	0.00	(0.00, 100.0)
Depan H	444	7	1.58	2.11	1.85	(0.74, 3.82)
#McIlduff J	411	4	0.97	1.90	1.27	(0.34, 3.26)
##Miller S	1	0	0.00	0.88	0.00	(0.00, 100.0)
#Older T	31	1	3.23	2.33	3.44	(0.04, 19.13)
##Saifi J	526	10	1.90	1.64	2.87	(1.37, 5.28)
All Others	36	0	0.00	1.24	0.00	(0.00, 20.42)
TOTAL	1457	22	1.51	1.86	2.01	(1.26, 3.05)
<b>Erie County Medical Center</b>						
#Bell-Thomson J	636	8	1.26	1.74	1.79	(0.77, 3.53)
#Jennings L	2	0	0.00	5.26	0.00	(0.00, 86.40)
TOTAL	638	8	1.25	1.75	1.78	(0.76, 3.50)

**Table 3 continued**

	Cases	No. of Deaths	OMR	EMR	RAMR	95% CI for RAMR
<b>Lenox Hill Hospital</b>						
##Geller C	88	6	6.82	1.54	10.96 *	(4.00, 23.86)
#Jacobowitz I	255	5	1.96	2.97	1.64	(0.53, 3.82)
McCabe J	189	4	2.12	2.11	2.49	(0.67, 6.38)
#Sabado M	31	1	3.23	2.60	3.08	(0.04, 17.13)
#Stelzer P	353	11	3.12	2.38	3.24	(1.62, 5.80)
Subramanian V	1285	52	4.05	2.68	3.75 *	(2.80, 4.92)
All Others	7	2	28.57	1.35	52.44 *	(5.89, 100.0)
TOTAL	2208	81	3.67	2.56	3.55 *	(2.82, 4.41)
<b>Long Island Jewish Medical Center</b>						
Graver L	562	12	2.14	2.07	2.56	(1.32, 4.47)
#Kerr P	15	2	13.33	4.93	6.71	(0.75, 24.23)
Palazzo R	454	8	1.76	2.18	2.01	(0.86, 3.95)
All Others	179	2	1.12	1.91	1.45	(0.16, 5.23)
TOTAL	1210	24	1.98	2.12	2.32	(1.48, 3.45)
<b>Maimonides Medical Center</b>						
#Acinapura A	272	10	3.68	2.44	3.74	(1.79, 6.88)
#Burack J	3	0	0.00	3.16	0.00	(0.00, 96.09)
Cane J	19	1	5.26	3.40	3.84	(0.05, 21.38)
#Cunningham J N	370	16	4.32	2.42	4.43 *	(2.53, 7.19)
#Jacobowitz I	1133	33	2.91	3.18	2.27	(1.56, 3.19)
#Ketosugbo A	110	5	4.55	2.67	4.23	(1.36, 9.87)
#Sabado M	355	18	5.07	3.50	3.59	(2.13, 5.67)
#Zisbrod Z	91	2	2.20	2.75	1.99	(0.22, 7.17)
All Others	151	1	0.66	3.36	0.49	(0.01, 2.72)
TOTAL	2504	86	3.43	3.01	2.83	(2.26, 3.50)
<b>Millard Fillmore Hospital</b>						
Aldridge J	542	15	2.77	2.21	3.10	(1.73, 5.12)
#Bell-Thomson J	49	1	2.04	2.64	1.92	(0.03, 10.67)
Guarino R	506	19	3.75	1.80	5.18 *	(3.12, 8.09)
#Jennings L	591	19	3.21	2.18	3.65	(2.20, 5.70)
#Kerr P	272	18	6.62	2.38	6.90 *	(4.08, 10.90)
Major W	202	2	0.99	2.18	1.13	(0.13, 4.08)
All Others	78	1	1.28	2.00	1.59	(0.02, 8.85)
TOTAL	2240	75	3.35	2.13	3.90 *	(3.07, 4.89)

Table 3 continued

	Cases	No. of Deaths	OMR	EMR	RAMR	95% CI for RAMR
<b>Montefiore Medical Center - Moses Division</b>						
Attai L	394	12	3.05	1.87	4.05	(2.09, 7.07)
Brodman R	308	6	1.95	1.42	3.41	(1.25, 7.43)
#Camacho M	148	10	6.76	1.81	9.26 *	(4.43,17.03)
#Frymus M	2	0	0.00	0.84	0.00	(0.00,100.0)
##Geller C	21	0	0.00	0.85	0.00	(0.00,51.02)
##Gold J	23	0	0.00	1.77	0.00	(0.00,22.38)
Merav A	274	7	2.55	2.04	3.10	(1.24, 6.40)
All Others	11	1	9.09	1.88	11.99	(0.16,66.70)
TOTAL	1181	36	3.05	1.76	4.29 *	(3.01, 5.95)
<b>Montefiore Medical Center - Weiler Division</b>						
#Camacho M	2	0	0.00	0.77	0.00	(0.00,100.0)
Frater R	91	2	2.20	1.47	3.71	(0.42,13.40)
#Frymus M	410	7	1.71	2.16	1.96	(0.78, 4.03)
##Geller C	43	1	2.33	2.27	2.54	(0.03,14.12)
##Gold J	4	0	0.00	1.01	0.00	(0.00,100.0)
Sisto D	373	15	4.02	3.02	3.31	(1.85, 5.46)
TOTAL	923	25	2.71	2.44	2.76	(1.78, 4.07)
<b>Mount Sinai Hospital</b>						
Ergin M	528	8	1.52	2.89	1.30	(0.56, 2.57)
Galla J	333	16	4.80	4.06	2.94	(1.68, 4.77)
Griep R	87	3	3.45	2.03	4.21	(0.85,12.31)
Lansman S	441	21	4.76	3.59	3.29	(2.03, 5.03)
All Others	129	3	2.33	3.55	1.62	(0.33, 4.74)
TOTAL	1518	51	3.36	3.36	2.48	(1.85, 3.27)
<b>New York Hospital - Cornell</b>						
#Altorki N	149	6	4.03	2.33	4.28	(1.56, 9.32)
##Gold J	178	3	1.69	2.48	1.69	(0.34, 4.92)
Isom O	276	6	2.17	1.99	2.71	(0.99, 5.90)
Krieger K	774	15	1.94	2.54	1.89	(1.06, 3.12)
#Lang S	706	19	2.69	2.94	2.27	(1.37, 3.55)
#Rosengart T	550	12	2.18	3.35	1.61	(0.83, 2.82)
All Others	37	2	5.41	5.32	2.52	(0.28, 9.10)
TOTAL	2670	63	2.36	2.78	2.11	(1.62, 2.69)
<b>New York Hospital - Queens</b>						
#Altorki N	1	0	0.00	1.60	0.00	(0.00,100.0)
#Lang S	70	0	0.00	1.48	0.00	(0.00, 8.75)
#Rosengart T	3	0	0.00	1.32	0.00	(0.00,100.0)
All Others	20	1	5.00	1.46	8.51	(0.11,47.35)
TOTAL	94	1	1.06	1.47	1.79	(0.02, 9.95)

Table 3 continued

	Cases	No. of Deaths	OMR	EMR	RAMR	95% CI for RAMR
<b>NYU Hospitals Center</b>						
#Colvin S	253	12	4.74	3.84	3.06	(1.58, 5.35)
#Crawford B	95	2	2.11	2.83	1.84	(0.21, 6.65)
Culliford A	401	3	0.75	2.64	0.70 **	(0.14, 2.05)
Esposito R	294	6	2.04	3.52	1.44	(0.52, 3.13)
#Galloway A	231	6	2.60	2.80	2.30	(0.84, 5.01)
#Glassman L	63	2	3.17	3.78	2.09	(0.23, 7.53)
#Grossi E	180	8	4.44	3.49	3.16	(1.36, 6.22)
#Ribakove G	179	11	6.15	4.41	3.45	(1.72, 6.18)
Spencer F	163	11	6.75	3.59	4.66	(2.33, 8.35)
TOTAL	1859	61	3.28	3.35	2.43	(1.86, 3.12)
<b>North Shore University Hospital</b>						
Hall M	796	9	1.13	2.53	1.11 **	(0.51, 2.11)
Nelson R	125	1	0.80	2.19	0.91	(0.01, 5.05)
Pogo G	547	12	2.19	2.11	2.57	(1.33, 4.50)
Tortolani A	579	12	2.07	2.29	2.24	(1.16, 3.91)
All Others	35	0	0.00	2.11	0.00	(0.00, 12.35)
TOTAL	2082	34	1.63	2.33	1.74 **	(1.21, 2.43)
<b>Presbyterian Hospital - City of New York</b>						
Bregman D	67	1	1.49	2.14	1.73	(0.02, 9.63)
Michler R	282	8	2.84	2.91	2.42	(1.04, 4.76)
Oz M	424	13	3.07	2.88	2.64	(1.40, 4.51)
Rose E	406	5	1.23	1.67	1.83	(0.59, 4.26)
Smith C	654	10	1.53	2.57	1.48	(0.71, 2.71)
Spotnitz H	19	3	15.79	1.72	22.83 *	(4.59, 66.71)
All Others	21	1	4.76	1.50	7.88	(0.10, 43.82)
TOTAL	1873	41	2.19	2.46	2.21	(1.58, 2.99)
<b>Rochester General Hospital</b>						
Cheeran D	847	26	3.07	2.22	3.42	(2.24, 5.02)
Kirshner R	863	29	3.36	3.55	2.35	(1.57, 3.37)
Knight P	969	25	2.58	2.80	2.28	(1.48, 3.37)
Kwan S	306	14	4.58	3.48	3.26	(1.78, 5.47)
All Others	81	3	3.70	3.15	2.92	(0.59, 8.53)
TOTAL	3066	97	3.16	2.93	2.68	(2.17, 3.27)

Table 3 continued

	Cases	No. of Deaths	OMR	EMR	RAMR	95% CI for RAMR
<b>St. Francis Hospital</b>						
Bercow N	824	15	1.82	2.21	2.04	(1.14, 3.36)
Damus P	644	6	0.93	1.91	1.21	(0.44, 2.64)
Durban L	409	7	1.71	3.53	1.20 **	(0.48, 2.48)
Lamendola C	591	8	1.35	2.63	1.27	(0.55, 2.51)
Robinson N	919	16	1.74	2.15	2.01	(1.15, 3.26)
Taylor J	1079	17	1.58	2.51	1.56	(0.91, 2.49)
Weisz D	696	20	2.87	2.68	2.66	(1.63, 4.11)
All Others	31	0	0.00	2.01	0.00	(0.00, 14.61)
TOTAL	5193	89	1.71	2.44	1.74 **	(1.40, 2.15)
<b>St. Joseph's Hospital Health Center</b>						
Marvasti M	490	1	0.20	1.79	0.28 **	(0.00, 1.57)
Nast E	621	10	1.61	2.30	1.73	(0.83, 3.19)
Nazem A	639	7	1.10	2.75	0.99 **	(0.40, 2.04)
Rosenberg J	584	3	0.51	1.85	0.69 **	(0.14, 2.02)
TOTAL	2334	21	0.90	2.20	1.01 **	(0.63, 1.55)
<b>St. Luke's Roosevelt Hospital - St. Lukes Div.</b>						
Anagnostopoulos C	234	13	5.56	2.37	5.81 *	(3.09, 9.93)
Aronis M	545	11	2.02	1.75	2.86	(1.43, 5.12)
Connery C	71	3	4.23	2.12	4.94	(0.99, 14.43)
Mindich B	127	4	3.15	1.80	4.33	(1.17, 11.09)
Swistel D	422	13	3.08	3.09	2.47	(1.31, 4.22)
TOTAL	1399	44	3.15	2.28	3.42 *	(2.48, 4.59)
<b>St. Peter's Hospital</b>						
##Banker M	279	3	1.08	2.50	1.07	(0.21, 3.12)
#Bennett E	570	10	1.75	2.05	2.12	(1.01, 3.90)
##Dal Col R	610	6	0.98	1.94	1.26	(0.46, 2.74)
#McIlduff J	14	1	7.14	2.06	8.58	(0.11, 47.75)
##Miller S	44	1	2.27	2.79	2.02	(0.03, 11.25)
#Older T	234	9	3.85	2.51	3.79	(1.73, 7.20)
##Saifi J	1	0	0.00	16.35	0.00	(0.00, 55.64)
All Others	229	4	1.75	2.13	2.03	(0.55, 5.20)
TOTAL	1981	34	1.72	2.17	1.97	(1.36, 2.75)
<b>St. Vincent's Hospital and Medical Center</b>						
#Acinapura A	59	3	5.08	1.28	9.88	(1.99, 28.86)
Galdieri R	498	26	5.22	2.59	5.00 *	(3.26, 7.32)
McGinn J	558	9	1.61	3.66	1.09 **	(0.50, 2.08)
Tyras D	541	18	3.33	2.14	3.85	(2.28, 6.08)
TOTAL	1656	56	3.38	2.76	3.04	(2.30, 3.95)

*Table 3 continued*

	Cases	No. of Deaths	OMR	EMR	RAMR	95% CI for RAMR
<b>Strong Memorial Hospital</b>						
Hicks G	631	17	2.69	2.79	2.39	(1.39, 3.83)
Risher W	641	21	3.28	2.19	3.72	(2.30, 5.68)
All Others	6	1	16.67	4.30	9.61	(0.13, 53.48)
TOTAL	1278	39	3.05	2.49	3.03	(2.16, 4.15)
<b>United Health Services - Wilson Division</b>						
Cunningham J R	393	7	1.78	2.50	1.77	(0.71, 3.64)
Wong K	383	10	2.61	2.51	2.59	(1.24, 4.75)
Yousuf M	397	11	2.77	3.07	2.24	(1.12, 4.01)
TOTAL	1173	28	2.39	2.69	2.20	(1.46, 3.18)
<b>University Hospital of Brooklyn</b>						
Anderson J	153	5	3.27	2.64	3.07	(0.99, 7.15)
#Burack J	153	6	3.92	2.88	3.37	(1.23, 7.34)
#Cunningham J N	11	0	0.00	2.90	0.00	(0.00, 28.53)
#Ketosugbo A	3	0	0.00	6.15	0.00	(0.00, 49.28)
Piccone V	37	1	2.70	2.70	2.48	(0.03, 13.81)
#Zisbrod Z	340	10	2.94	2.67	2.73	(1.31, 5.02)
All Others	12	1	8.33	3.64	5.68	(0.07, 31.59)
TOTAL	709	23	3.24	2.75	2.93	(1.86, 4.39)
<b>University Hospital (Stony Brook)</b>						
Bilfinger T	370	11	2.97	3.55	2.08	(1.04, 3.72)
#Hartman A	431	4	0.93	2.21	1.04	(0.28, 2.66)
Levy M	373	8	2.14	2.56	2.08	(0.90, 4.10)
Seifert F	283	9	3.18	2.31	3.42	(1.56, 6.49)
TOTAL	1457	32	2.20	2.66	2.05	(1.40, 2.89)
<b>University Hospital Upstate Medical Center</b>						
Brandt B	187	8	4.28	1.91	5.57	(2.40, 10.97)
Parker F	308	5	1.62	1.67	2.41	(0.78, 5.63)
Picone A	311	8	2.57	1.86	3.43	(1.48, 6.76)
Ryan P	342	8	2.34	1.73	3.36	(1.45, 6.62)
All Others	156	4	2.56	2.05	3.11	(0.84, 7.95)
TOTAL	1304	33	2.53	1.81	3.47	(2.39, 4.87)
<b>Westchester County Medical Center</b>						
Axelrod H	345	13	3.77	3.24	2.88	(1.53, 4.93)
Fleisher A	493	10	2.03	2.09	2.40	(1.15, 4.42)
Lafaro R	412	18	4.37	2.11	5.14 *	(3.05, 8.13)
Moggio R	413	5	1.21	2.53	1.19	(0.38, 2.77)
Pooley R	353	19	5.38	2.50	5.33 *	(3.21, 8.32)
Sarabu M	427	4	0.94	2.83	0.82 **	(0.22, 2.10)
All Others	13	1	7.69	2.11	9.06	(0.12, 50.38)
TOTAL	2456	70	2.85	2.52	2.81	(2.19, 3.55)

**Table 3 continued**

	Cases	No. of Deaths	OMR	EMR	RAMR	95% CI for RAMR
<b>Winthrop - University Hospital</b>						
#Hartman A	153	2	1.31	2.99	1.08	(0.12, 3.91)
Kofsky E	421	8	1.90	2.18	2.17	(0.93, 4.27)
Mohtashemi M	250	7	2.80	2.75	2.53	(1.01, 5.21)
Schubach S	505	13	2.57	2.77	2.30	(1.22, 3.94)
Scott W	297	5	1.68	2.56	1.63	(0.53, 3.80)
Sutaria M	107	8	7.48	6.22	2.98	(1.28, 5.88)
Williams L	118	7	5.93	3.40	4.33	(1.73, 8.91)
All Others	88	5	5.68	3.43	4.11	(1.32, 9.58)
TOTAL	1939	55	2.84	2.88	2.44	(1.84, 3.18)
<b>Statewide Total</b>	<b>57412</b>	<b>1424</b>	<b>2.48</b>			

\* Risk-adjusted mortality rate is significantly higher than statewide rate.

\*\* Risk-adjusted mortality rate is significantly lower than statewide rate.

# Performed operations in another New York State hospital

## Performed operations in two or more other New York State hospitals

OMR - the observed mortality rate is the number of observed deaths divided by the number of patients.

EMR - the expected mortality rate is the sum of the predicted probabilities of death for each patient divided by the total number of patients.

RAMR - the risk-adjusted mortality rate is the best estimate, based on the statistical model, of what the provider's mortality rate would have been if the provider had a mix of patients identical to the statewide mix. It is computed as the quotient of the OMR and the EMR (OMR/EMR) multiplied by the statewide mortality rate for the time period.

**Table 4:** Summary Information for Surgeons Practicing at More than One Hospital, 1994-1996

	Cases	No. of Deaths	OMR	EMR	RAMR	95% CI for RAMR
<b>Acinapura A</b>						
Maimonides	272	10	3.68	2.44	3.74	(1.79, 6.88)
St. Vincent's	59	3	5.08	1.28	9.88	(1.99, 28.86)
Total	331	13	3.93	2.23	4.37	(2.32, 7.47)
<b>Altorki N</b>						
New York Hospital-Cornell	149	6	4.03	2.33	4.28	(1.56, 9.32)
New York Hospital-Queens	1	0	0.00	1.60	0.00	(0.00, 100.00)
Total	150	6	4.00	2.33	4.26	(1.56, 9.28)
<b>Banker M</b>						
Albany Med Ctr	232	5	2.16	1.44	3.70	(1.19, 8.64)
Ellis Hospital	1	0	0.00	0.92	0.00	(0.00, 100.00)
St. Peter's	279	3	1.08	2.50	1.07	(0.21, 3.12)
Total	512	8	1.56	2.02	1.92	(0.83, 3.79)
<b>Bell-Thomson J</b>						
Erie County	636	8	1.26	1.74	1.79	(0.77, 3.53)
Millard Fillmore	49	1	2.04	2.64	1.92	(0.03, 10.67)
Total	685	9	1.31	1.80	1.81	(0.82, 3.43)
<b>Bennett E</b>						
Albany Med Ctr	56	0	0.00	2.71	0.00	(0.00, 5.99)
St. Peter's	570	10	1.75	2.05	2.12	(1.01, 3.90)
Total	626	10	1.60	2.11	1.88	(0.90, 3.45)
<b>Britton L</b>						
Albany Med Ctr	473	5	1.06	1.70	1.54	(0.50, 3.60)
Ellis Hospital	2	0	0.00	0.95	0.00	(0.00, 100.00)
Total	475	5	1.05	1.70	1.54	(0.50, 3.59)
<b>Burack J</b>						
Maimonides	3	0	0.00	3.16	0.00	(0.00, 96.09)
Univ Hosp - Brooklyn	153	6	3.92	2.88	3.37	(1.23, 7.34)
Total	156	6	3.85	2.89	3.30	(1.21, 7.19)
<b>Camacho M</b>						
Montefiore-Moses	148	10	6.76	1.81	9.26*	(4.43, 17.03)
Montefiore-Weiler	2	0	0.00	0.77	0.00	(0.00, 100.00)
Total	150	10	6.67	1.80	9.21*	(4.41, 16.94)
<b>Canavan T</b>						
Albany Med Ctr	600	5	0.83	1.75	1.18	(0.38, 2.76)
Ellis Hospital	2	0	0.00	1.36	0.00	(0.00, 100.00)
Total	602	5	0.83	1.74	1.18	(0.38, 2.76)

**Table 4 continued**

	<b>Cases</b>	<b>No. of Deaths</b>	<b>OMR</b>	<b>EMR</b>	<b>RAMR</b>	<b>95% CI for RAMR</b>
<b>Colvin S</b>						
Bellevue	46	8	17.39	2.86	15.08*	(6.50, 29.72)
NYU Hosp Ctr	253	12	4.74	3.84	3.06	(1.58, 5.35)
Total	299	20	6.69	3.69	4.49*	(2.74, 6.94)
<b>Crawford B</b>						
Bellevue	1	0	0.00	5.21	0.00	(0.00, 100.00)
NYU Hosp Ctr	95	2	2.11	2.83	1.84	(0.21, 6.65)
Total	96	2	2.08	2.86	1.81	(0.20, 6.53)
<b>Cunningham J N</b>						
Maimonides	370	16	4.32	2.42	4.43*	(2.53, 7.19)
Univ Hosp - Brooklyn	11	0	0.00	2.90	0.00	(0.00, 28.53)
Total	381	16	4.20	2.44	4.27	(2.44, 6.94)
<b>Dal Col R</b>						
Albany Med Ctr	3	0	0.00	0.84	0.00	(0.00, 100.00)
Ellis Hospital	3	0	0.00	1.66	0.00	(0.00, 100.00)
St. Peter's	610	6	0.98	1.94	1.26	(0.46, 2.74)
Total	616	6	0.97	1.93	1.25	(0.46, 2.73)
<b>Frymus M</b>						
Montefiore-Moses	2	0	0.00	0.84	0.00	(0.00, 100.00)
Montefiore-Weiler	410	7	1.71	2.16	1.96	(0.78, 4.03)
Total	412	7	1.70	2.16	1.95	(0.78, 4.02)
<b>Galloway A</b>						
Bellevue	48	2	4.17	2.54	4.07	(0.46, 14.70)
NYU Hosp Ctr	231	6	2.60	2.80	2.30	(0.84, 5.01)
Total	279	8	2.87	2.76	2.58	(1.11, 5.09)
<b>Geller C</b>						
Lenox Hill	88	6	6.82	1.54	10.96*	(4.00, 23.86)
Montefiore-Moses	21	0	0.00	0.85	0.00	(0.00, 51.02)
Montefiore-Weiler	43	1	2.33	2.27	2.54	(0.03, 14.12)
Total	152	7	4.61	1.65	6.91*	(2.77, 14.23)
<b>Glassman L</b>						
Bellevue	114	4	3.51	2.04	4.27	(1.15, 10.93)
NYU Hosp Ctr	63	2	3.17	3.78	2.09	(0.23, 7.53)
Total	177	6	3.39	2.66	3.16	(1.16, 6.89)
<b>Gold J</b>						
Montefiore-Moses	23	0	0.00	1.77	0.00	(0.00, 22.38)
Montefiore-Weiler	4	0	0.00	1.01	0.00	(0.00, 100.00)
New York Hospital-Cornell	178	3	1.69	2.48	1.69	(0.34, 4.92)
Total	205	3	1.46	2.37	1.53	(0.31, 4.47)

**Table 4 continued**

	Cases	No. of Deaths	OMR	EMR	RAMR	95% CI for RAMR
<b>Grossi E</b>						
Bellevue	3	1	33.33	5.11	16.17	(0.21, 89.95)
NYU Hosp Ctr	180	8	4.44	3.49	3.16	(1.36, 6.22)
Total	183	9	4.92	3.52	3.47	(1.58, 6.58)
<b>Hartman A</b>						
Univ Hosp - Stony Brook	431	4	0.93	2.21	1.04	(0.28, 2.66)
Winthrop Univ Hosp	153	2	1.31	2.99	1.08	(0.12, 3.91)
Total	584	6	1.03	2.42	1.05 **	(0.39, 2.30)
<b>Jacobowitz I</b>						
Lenox Hill	255	5	1.96	2.97	1.64	(0.53, 3.82)
Maimonides	1133	33	2.91	3.18	2.27	(1.56, 3.19)
Total	1388	38	2.74	3.14	2.16	(1.53, 2.96)
<b>Jennings L</b>						
Erie County	2	0	0.00	5.26	0.00	(0.00, 86.40)
Millard Fillmore	591	19	3.21	2.18	3.65	(2.20, 5.70)
Total	593	19	3.20	2.19	3.62	(2.18, 5.66)
<b>Kerr P</b>						
LIJ Medical Center	15	2	13.33	4.93	6.71	(0.75, 24.23)
Millard Fillmore	272	18	6.62	2.38	6.90 *	(4.08, 10.90)
Total	287	20	6.97	2.51	6.88 *	(4.20, 10.62)
<b>Ketosugbo A</b>						
Maimonides	110	5	4.55	2.67	4.23	(1.36, 9.87)
Univ Hosp - Brooklyn	3	0	0.00	6.15	0.00	(0.00, 49.28)
Total	113	5	4.42	2.76	3.98	(1.28, 9.28)
<b>Lang S</b>						
New York Hospital-Cornell	706	19	2.69	2.94	2.27	(1.37, 3.55)
New York Hospital-Queens	70	0	0.00	1.48	0.00	(0.00, 8.75)
Total	776	19	2.45	2.81	2.16	(1.30, 3.38)
<b>McIlduff J</b>						
Ellis Hospital	411	4	0.97	1.90	1.27	(0.34, 3.26)
St.Peter's	14	1	7.14	2.06	8.58	(0.11, 47.75)
Total	425	5	1.18	1.90	1.53	(0.49, 3.58)
<b>Miller S</b>						
Albany Med Ctr	458	3	0.66	2.25	0.72 **	(0.15, 2.11)
Ellis Hospital	1	0	0.00	0.88	0.00	(0.00, 100.00)
St. Peter's	44	1	2.27	2.79	2.02	(0.03, 11.25)
Total	503	4	0.80	2.30	0.86 **	(0.23, 2.20)

**Table 4 continued**

	<b>Cases</b>	<b>No. of Deaths</b>	<b>OMR</b>	<b>EMR</b>	<b>RAMR</b>	<b>95% CI for RAMR</b>
<b>Older T</b>						
Ellis Hospital	31	1	3.23	2.33	3.44	(0.04, 19.13)
St. Peter's	234	9	3.85	2.51	3.79	(1.73, 7.20)
Total	265	10	3.77	2.49	3.76	(1.80, 6.91)
<b>Ribakove G</b>						
Bellevue	78	2	2.56	2.24	2.84	(0.32, 10.26)
NYU Hosp Ctr	179	11	6.15	4.41	3.45	(1.72, 6.18)
Total	257	13	5.06	3.75	3.34	(1.78, 5.72)
<b>Rosengart T</b>						
New York Hospital-Cornell	550	12	2.18	3.35	1.61	(0.83, 2.82)
New York Hospital-Queens	3	0	0.00	1.32	0.00	(0.00, 100.00)
Total	553	12	2.17	3.34	1.61	(0.83, 2.81)
<b>Sabado M</b>						
Lenox Hill	31	1	3.23	2.60	3.08	(0.04, 17.13)
Maimonides	355	18	5.07	3.50	3.59	(2.13, 5.67)
Total	386	19	4.92	3.43	3.56	(2.14, 5.56)
<b>Saifi J</b>						
Albany Med Ctr	2	0	0.00	3.24	0.00	(0.00, 100.00)
Ellis Hospital	526	10	1.90	1.64	2.87	(1.37, 5.28)
St. Peter's	1	0	0.00	16.35	0.00	(0.00, 55.64)
Total	529	10	1.89	1.68	2.80	(1.34, 5.14)
<b>Stelzer P</b>						
Beth Israel	101	1	0.99	2.80	0.88	(0.01, 4.87)
Lenox Hill	353	11	3.12	2.38	3.24	(1.62, 5.80)
Total	454	12	2.64	2.48	2.65	(1.37, 4.62)
<b>Zisbrod Z</b>						
Maimonides	91	2	2.20	2.75	1.99	(0.22, 7.17)
Univ Hosp-Brooklyn	340	10	2.94	2.67	2.73	(1.31, 5.02)
Total	431	12	2.78	2.69	2.57	(1.33, 4.49)

\* Risk-adjusted rate is significantly higher than statewide rate.

\*\* Risk-adjusted rate is significantly lower than statewide rate.

OMR - the observed mortality rate is the number of observed deaths divided by the number of patients.

EMR - the expected mortality rate is the sum of the predicted probability of death for each patient divided by the total number of patients.

RAMR - the risk-adjusted mortality rate is the best estimate, based on the statistical model, of what the provider's mortality rate would have been if the provider had a mix of patients identical to the statewide mix.

## SURGEON AND HOSPITAL VOLUMES FOR ADULT CARDIAC SURGERY AND FOR ISOLATED CABG SURGERY (1994-1996)

Table 5 presents, for each hospital and for each surgeon performing at least 200 isolated CABG operations at that hospital in 1994-1996 **and/or performing one or more isolated CABG operations in each of the years 1994- 1996**, the total number of adult cardiac surgeries performed, the total number of isolated CABG operations performed and the percentage of all adult cardiac surgeries that were isolated CABG operations. As in Table 3, results for surgeons not meeting the above criteria are grouped together in an “All Others” category.

Isolated CABG volumes include patients who undergo bypass of one or more of the coronary

arteries with no other major heart surgery during the same admission. Total adult cardiac surgery cases include isolated CABG, CABG combined with another cardiac procedure such as valve repair or replacement, single or multiple valve replacements and any other surgery on the heart or great vessels.

As indicated, the statewide percentage of adult cardiac surgeries that were isolated CABG operations in 1994-1996 was 73.92 percent (57,412 CABG operations out of a total of 77,668 total adult cardiac surgeries).

**Table 5:** Total Cardiac Surgery and Isolated CABG Surgery Volumes by Hospital and Surgeon, 1994-1996

	Total Cardiac Surgery	Isolated CABGs	% Isolated CABG
<b>Albany Medical Center Hospital</b>			
Banker M	249	232	93.17
Bennett E	67	56	83.58
Britton L	653	473	72.43
Canavan T	681	600	88.11
Dal Col R	3	3	100.00
Ferraris V	321	229	71.34
Foster E	430	276	64.19
Kelley J	545	438	80.37
Luber J	763	528	69.20
Miller S	539	458	84.97
Saifi J	2	2	100.00
All Others	200	171	85.50
TOTAL	4453	3466	77.84
<b>Arnot-Ogden Medical Center</b>			
Borja A	194	157	80.93
Quintos E	302	260	86.09
Vaughan J	173	153	88.44
TOTAL	669	570	85.20

*Table 5 continued*

	Total Cardiac Surgery	Isolated CABGs	% Isolated CABG
<b>Bellevue Hospital Center</b>			
Colvin S	131	46	35.11
Crawford B	1	1	100.00
Galloway A	89	48	53.93
Glassman L	151	114	75.50
Grossi E	3	3	100.00
Ribakove G	144	78	54.17
TOTAL	519	290	55.88
<b>Beth Israel Medical Center</b>			
Hoffman D	169	147	86.98
Stelzer P	178	101	56.74
Tranbaugh R	1099	772	70.25
All Others	35	33	94.29
TOTAL	1481	1053	71.10
<b>Buffalo General Hospital</b>			
Bergsland J	665	498	74.89
Bhayana J	631	318	50.40
Grosner G	802	723	90.15
Lajos T	578	494	85.47
Levinsky L	262	247	94.27
Lewin A	688	643	93.46
Raza S	657	493	75.04
Salerno T	244	214	87.70
All Others	14	1	7.14
TOTAL	4541	3631	79.96
<b>Ellis Hospital</b>			
Banker M	1	1	100.00
Britton L	3	2	66.67
Canavan T	2	2	100.00
Dal Col R	4	3	75.00
Depan H	614	444	72.31
McIlduff J	501	411	82.04
Miller S	1	1	100.00
Older T	46	31	67.39
Saifi J	616	526	85.39
All Others	44	36	81.82
TOTAL	1832	1457	79.53
<b>Erie County Medical Center</b>			
Bell-Thomson J	768	636	82.81
Jennings L	2	2	100.00
TOTAL	770	638	82.86

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*Table 5 continued*

	Total Cardiac Surgery	Isolated CABGs	% Isolated CABG
<b>Lenox Hill Hospital</b>			
Geller C	103	88	85.44
Jacobowitz I	306	255	83.33
McCabe J	247	189	76.52
Sabado M	42	31	73.81
Stelzer P	607	353	58.15
Subramanian V	1541	1285	83.39
All Others	11	7	63.64
TOTAL	2857	2208	77.28
<b>Long Island Jewish Medical Center</b>			
Graver L	801	562	70.16
Kerr P	18	15	83.33
Palazzo R	544	454	83.46
All Others	210	179	85.24
TOTAL	1573	1210	76.92
<b>Maimonides Medical Center</b>			
Acinapura A	342	272	79.53
Burack J	4	3	75.00
Cane J	23	19	82.61
Cunningham J N	511	370	72.41
Jacobowitz I	1401	1133	80.87
Ketosugbo A	130	110	84.62
Sabado M	427	355	83.14
Zisbrod Z	107	91	85.05
All Others	178	151	84.83
TOTAL	3123	2504	80.18
<b>Millard Fillmore Hospital</b>			
Aldridge J	627	542	86.44
Bell-Thomson J	69	49	71.01
Guarino R	559	506	90.52
Jennings L	670	591	88.21
Kerr P	313	272	86.90
Major W	222	202	90.99
All Others	89	78	87.64
TOTAL	2549	2240	87.88

*Table 5 continued*

	<b>Total Cardiac Surgery</b>	<b>Isolated CABGs</b>	<b>% Isolated CABG</b>
<b>Montefiore Medical Center - Moses Division</b>			
Attai L	539	394	73.10
Brodman R	452	308	68.14
Camacho M	200	148	74.00
Frymus M	3	2	66.67
Geller C	24	21	87.50
Gold J	31	23	74.19
Merav A	378	274	72.49
All Others	25	11	44.00
TOTAL	1652	1181	71.49
<b>Montefiore Medical Center - Weiler Division</b>			
Camacho M	2	2	100.00
Frater R	213	91	42.72
Frymus M	496	410	82.66
Geller C	45	43	95.56
Gold J	9	4	44.44
Sisto D	512	373	72.85
TOTAL	1277	923	72.28
<b>Mount Sinai Hospital</b>			
Ergin M	836	528	63.16
Galla J	543	333	61.33
Griep R	406	87	21.43
Lansman S	708	441	62.29
All Others	225	129	57.33
TOTAL	2718	1518	55.85
<b>New York Hospital - Cornell</b>			
Altorki N	202	149	73.76
Gold J	314	178	56.69
Isom O	607	276	45.47
Krieger K	1091	774	70.94
Lang S	1027	706	68.74
Rosengart T	778	550	70.69
All Others	65	37	56.92
TOTAL	4084	2670	65.38
<b>New York Hospital - Queens</b>			
Altorki N	1	1	100.00
Lang S	81	70	86.42
Rosengart T	3	3	100.00
All Others	23	20	86.96
TOTAL	108	94	87.04

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**Table 5 continued**

	<b>Total Cardiac Surgery</b>	<b>Isolated CABGs</b>	<b>% Isolated CABG</b>
<b>NYU Hospitals Center</b>			
Colvin S	621	253	40.74
Crawford B	116	95	81.90
Culliford A	720	401	55.69
Esposito R	451	294	65.19
Galloway A	447	231	51.68
Glassman L	77	63	81.82
Grossi E	294	180	61.22
Ribakove G	252	179	71.03
Spencer F	341	163	47.80
All Others	1	0	0.00
TOTAL	3320	1859	55.99
<b>North Shore University Hospital</b>			
Hall M	1042	796	76.39
Nelson R	161	125	77.64
Pogo G	692	547	79.05
Tortolani A	683	579	84.77
All Others	66	35	53.03
TOTAL	2644	2082	78.74
<b>Presbyterian Hospital - City of New York</b>			
Bregman D	96	67	69.79
Michler R	536	282	52.61
Oz M	773	424	54.85
Rose E	666	406	60.96
Smith C	1025	654	63.80
Spotnitz H	33	19	57.58
All Others	206	21	10.19
TOTAL	3335	1873	56.16
<b>Rochester General Hospital</b>			
Cheeran D	1075	847	78.79
Kirshner R	1086	863	79.47
Knight P	1257	969	77.09
Kwan S	350	306	87.43
All Others	88	81	92.05
TOTAL	3856	3066	79.51

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*Table 5 continued*

	<b>Total Cardiac Surgery</b>	<b>Isolated CABGs</b>	<b>% Isolated CABG</b>
<b>St. Francis Hospital</b>			
Bercow N	1042	824	79.08
Damus P	1203	644	53.53
Durban L	540	409	75.74
Lamendola C	750	591	78.80
Robinson N	1271	919	72.31
Taylor J	1410	1079	76.52
Weisz D	914	696	76.15
All Others	41	31	75.61
TOTAL	7171	5193	72.42
<b>St. Joseph's Hospital Health Center</b>			
Marvasti M	696	490	70.40
Nast E	709	621	87.59
Nazem A	733	639	87.18
Rosenberg J	856	584	68.22
TOTAL	2994	2334	77.96
<b>St. Luke's Roosevelt Hospital - St. Lukes Div.</b>			
Anagnostopoulos C	391	234	59.85
Aronis M	649	545	83.98
Connery C	113	71	62.83
Mindich B	255	127	49.80
Swistel D	514	422	82.10
TOTAL	1922	1399	72.79
<b>St. Peter's Hospital</b>			
Banker M	303	279	92.08
Bennett E	790	570	72.15
Dal Col R	717	610	85.08
McIlduff J	22	14	63.64
Miller S	54	44	81.48
Older T	312	234	75.00
Saifi J	1	1	100.00
All Others	262	229	87.40
TOTAL	2461	1981	80.50
<b>St. Vincent's Hospital and Medical Center</b>			
Acinapura A	69	59	85.51
Galdieri R	626	498	79.55
McGinn J	700	558	79.71
Tyras D	659	541	82.09
TOTAL	2054	1656	80.62

<i>Table 5 continued</i>	<b>Total Cardiac Surgery</b>	<b>Isolated CABGs</b>	<b>% Isolated CABG</b>
<b>Strong Memorial Hospital</b>			
Hicks G	916	631	68.89
Risher W	933	641	68.70
All Others	30	6	20.00
TOTAL	1879	1278	68.01
<b>United Health Services - Wilson Division</b>			
Cunningham J R	490	393	80.20
Wong K	452	383	84.73
Yousuf M	479	397	82.88
TOTAL	1421	1173	82.55
<b>University Hospital of Brooklyn</b>			
Anderson J	230	153	66.52
Burack J	192	153	79.69
Cunningham J N	19	11	57.89
Ketosugbo A	5	3	60.00
Piccone V	43	37	86.05
Zisbrod Z	412	340	82.52
All Others	24	12	50.00
TOTAL	925	709	76.65
<b>University Hospital (Stony Brook)</b>			
Bilfinger T	437	370	84.67
Hartman A	565	431	76.28
Levy M	452	373	82.52
Seifert F	447	283	63.31
All Others	1	0	0.00
TOTAL	1902	1457	76.60
<b>University Hospital Upstate Medical Center</b>			
Brandt B	283	187	66.08
Parker F	459	308	67.10
Picone A	409	311	76.04
Ryan P	425	342	80.47
All Others	230	156	67.83
TOTAL	1806	1304	72.20
<b>Westchester County Medical Center</b>			
Axelrod H	415	345	83.13
Fleisher A	637	493	77.39
Lafaro R	570	412	72.28
Moggio R	557	413	74.15
Pooley R	453	353	77.92
Sarabu M	608	427	70.23
All Others	40	13	32.50
TOTAL	3280	2456	74.88

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**Table 5 continued**

	<b>Total Cardiac Surgery</b>	<b>Isolated CABGs</b>	<b>% Isolated CABG</b>
<b>Winthrop - University Hospital</b>			
Hartman A	228	153	67.11
Kofsky E	493	421	85.40
Mohtashemi M	287	250	87.11
Schubach S	701	505	72.04
Scott W	387	297	76.74
Sutaria M	142	107	75.35
Williams L	152	118	77.63
All Others	102	88	86.27
TOTAL	2492	1939	77.81
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<b>Statewide Total</b>	<b>77668</b>	<b>57412</b>	<b>73.92</b>

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## MEDICAL TERMINOLOGY

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**angina pectoris** - the pain or discomfort felt when blood and oxygen flow to the heart are impeded by blockage in the coronary arteries. Can also be caused by an arterial spasm.

**angioplasty**, also known as percutaneous transluminal coronary angioplasty (PTCA). In this procedure, a balloon catheter is threaded up to the site of blockage in an artery in the heart, and is then inflated to push arterial plaque against the wall of the artery to create a wider channel in the artery.

**arteriosclerosis** - the group of diseases characterized by thickening and loss of elasticity of the arterial walls, popularly called "hardening of the arteries." Also called atherosclerotic coronary artery disease or coronary artery disease.

**atherosclerosis** - one form of arteriosclerosis in which plaques or fatty deposits form in the inner layer of the arteries.

**coronary artery bypass graft surgery (CABG)** is a procedure in which a vein or artery from another part of the body is used to create an alternate path for blood to flow to the heart, bypassing the arterial blockage. Typically, a section of one of the large saphenous veins in the leg, the radial artery in the arm or the mammary artery in the chest is used to construct the bypass. One or more bypasses may be performed during a single operation. When no other major heart surgery (such as valve replacement) is included, the operation is referred to as an isolated CABG.

**double, triple, quadruple bypass** - the average number of bypass grafts created during coronary artery bypass graft surgery is three or four. Generally, all significantly blocked arteries are bypassed unless they enter areas of the heart that are permanently damaged by previous heart attacks. Five or more bypasses are occasionally created. Multiple bypasses are often performed to provide several alternate routes for the blood flow and to improve the long-term success of the procedure, not necessarily because the patient's condition is more severe.

**cardiac catheterization** - also known as coronary angiography - a procedure for diagnosing the condition of the heart and the arteries connecting to it. A thin tube threaded through an artery to the heart releases a dye, which allows doctors to observe blockages with an X-ray camera. This procedure is required before coronary bypass surgery.

**cardiovascular disease** - disease of the heart and blood vessels, the most common form is coronary artery disease.

**coronary arteries** - the arteries that supply the heart muscle with blood. When they are narrowed or blocked, blood and oxygen cannot flow freely to the heart muscle or myocardium.

**ischemic heart disease (ischemia)** - heart disease that occurs as a result of inadequate blood supply to the heart muscle or myocardium.

**myocardial infarction** - partial destruction of the heart muscle due to interrupted blood supply, also called a heart attack or coronary thrombosis.

**plaque** - also called atheroma, this is the fatty deposit in the coronary artery that can block blood flow.

**risk factors for heart disease** - certain risk factors have been found to increase the likelihood of developing heart disease. Some are controllable or avoidable, and some cannot be controlled. The biggest heart disease risk factors are heredity, gender and age; none of these which can be controlled. Men are much more likely to develop heart disease than women before the age of 55, although it is the number one killer of both men and women. The risk increases with age, so that half of all cases are in those who are more than 75 years old.

Some controllable risk factors that contribute to a higher likelihood of developing coronary artery disease are high cholesterol levels, cigarette smoking, high blood pressure (hypertension), obesity, a sedentary lifestyle or lack of exercise, diabetes and stress or Type A personality characteristics.

**stenosis** - the narrowing of an artery due to blockage. Restenosis is when the narrowing recurs after surgery.

## NEW YORK STATE CARDIAC SURGERY CENTERS

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Albany Medical Center Hospital  
New Scotland Avenue  
Albany, New York 12208

Arnot Ogden Medical Center  
600 Roe Avenue  
Elmira, New York 14905

Bellevue Hospital Center  
First Avenue and 27th Street  
New York, New York 10016

Beth Israel Medical Center  
10 Nathan D. Perlman Place  
New York, New York 10003

Buffalo General Hospital  
100 High Street  
Buffalo, New York 14203

Ellis Hospital  
1101 Nott Street  
Schenectady, New York

Erie County Medical Center  
462 Grider Street  
Buffalo, New York 14215

Lenox Hill Hospital  
100 East 77th Street  
New York, New York 10021

Long Island Jewish Medical Center  
270-05 76th Avenue  
New Hyde Park, New York 11040

Maimonides Medical Center  
4802 Tenth Avenue  
Brooklyn, New York 11219

Millard Fillmore Hospital  
3 Gates Circle  
Buffalo, New York 14209

Montefiore Medical Center  
Henry & Lucy Moses Division  
111 East 210th Street  
Bronx, New York 11219

Montefiore Medical Center-Weiler Division  
1825 Eastchester Road  
Bronx, New York 10461

Mount Sinai Medical Center  
One Gustave L. Levy Place  
New York, New York 10019

New York Hospital-Cornell Medical Center  
525 East 68th Street  
New York, New York 10021

NYU Hospitals Center  
550 First Avenue  
New York, New York 10016

New York Hospital Medical Center-Queens  
56-45 Main Street  
Flushing, New York 11355  
(beginning 1996)

Presbyterian Hospital - Atchley Pavillion  
161 Fort Washington Avenue  
New York, New York 10032

North Shore University Hospital  
300 Community Drive  
Manhasset, New York 11030

St. Francis Hospital  
Port Washington Boulevard  
Roslyn New York 11576

Rochester General Hospital  
1425 Portland Avenue  
Rochester, New York 14621-3079

St. Luke's Roosevelt Hospital Center  
11-11 Amsterdam Avenue at 114th Street  
New York, New York 10025

St. Joseph's Hospital Health Center  
301 Prospect Avenue  
Syracuse, New York 13203

St. Vincent's Hospital & Medical Center of NY  
153 West 11th Street  
New York, New York 10011

St. Peter's Hospital  
315 South Manning Boulevard  
Albany, New York 12208

United Health Services  
Wilson Hospital Division  
33-57 Harrison Street  
Johnson City, New York 13790

Strong Memorial Hospital  
601 Elmwood Avenue  
Rochester, New York 14642

University Hospital - Stony Brook  
SUNY Health Science Center at Stony Brook  
Stony Brook, New York 11794-8410

University Hospital of Brooklyn  
450 Lenox Road  
Brooklyn, New York 11203

Westchester County Medical Center  
Grasslands Reservation  
Valhalla, New York 10595

University Hospital Upstate Medical Center  
750 East Adams Street  
Syracuse, New York 13210

Winthrop University Hospital  
259 First Street  
Mineola, New York 11501

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